

Plaintiffs' Exhibit 64

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

UNITED STATES OF AMERICA, :
et al., :
 :
Plaintiffs :
 :
v. : No. 1:23-cv-00108
 :
GOOGLE, LLC, :
 :
Defendant. :


Tuesday, February 20, 2024

Video Deposition of RAMAMOORTHY RAVI,
PH.D., taken at the Offices of the United States
Department of Justice, 450 Fifth Street
Northwest, Washington, D.C., beginning at 9:32
a.m. Eastern Standard Time, before Ryan K. Black,
Registered Professional Reporter, Certified
Livenote Reporter and Notary Public in and for
the District of Columbia

Job No. CS6456599

<p style="text-align: right;">Page 242</p> <p>1 "Seller Best Practices." And if you flip to the 2 second page, at the bottom you'll see listed as a 3 best practice "to Ensure price floor parity 4 across your tech staff." And it says in the 5 last column, "Establishing consistent price 6 floors minimizes bidder errors and improves 7 bidder decision" -- "decisioning by eliminating 8 ambiguity." 9 All right. Does that surprise you to 10 see that Microsoft's Xandr company lists that as 11 a -- uniform price floors as a best practice? 12 MR. WOLIN: Objection to form. 13 THE WITNESS: Again, I've not thought 14 deeply enough to form a impression of surprise or 15 otherwise. 16 BY MR. ISAACSON: 17 Q. Right. When you say you haven't thought 18 deeply about it, are you saying that while you're 19 critical of Google implementing uniform pricing 20 rules, that you have no knowledge of whether its 21 competitors consider that to be a best practice 22 in the industry? 23 MR. WOLIN: Objection to form. 24 THE WITNESS: My opinions about uniform 25 pricing rules of Google come from examining the</p>	<p style="text-align: right;">Page 244</p> <p>1 whether these rules were appropriate for Google 2 or any of its competitors? 3 MR. WOLIN: Objection to form. 4 BY MR. ISAACSON: 5 Q. Referring to the unified pricing rules. 6 MR. WOLIN: Same objection. 7 THE WITNESS: My general understanding 8 is that the industry supported exchange-specific 9 floors, which the publishers were used to. And 10 that's what the publishers were complaining about 11 when unified pricing rules were introduced by 12 Google. 13 BY MR. ISAACSON: 14 Q. All right. So what time period are you 15 talking about where the pub -- you think that the 16 publishers were used to having exchange-specific 17 floors? 18 A. Around the time of the introduction of 19 unified pricing rules. That would be around 20 2019. 21 Q. All right. And since 2019, in the last 22 five years, do you know whether the industry has 23 moved towards unified pricing rules? 24 MR. WOLIN: Objection to form. 25 THE WITNESS: While I know they have</p>
<p style="text-align: right;">Page 243</p> <p>1 context in which they were deployed, which is 2 what I describe in the report. 3 I would need to develop sufficient 4 context to understand whether these rules were 5 appropriate or not and whether I should be 6 surprised or not. 7 BY MR. ISAACSON: 8 Q. Right. You have not done the work to 9 date to understand whether these rules were 10 appropriate or not; is that correct? 11 MR. WOLIN: Objection to form. 12 BY MR. ISAACSON: 13 Q. Referring to the unified -- unified 14 pricing rules? 15 MR. WOLIN: Same objection. 16 THE WITNESS: I did the work related to 17 Google's platform in examining the context of its 18 unified pricing rules. 19 BY MR. ISAACSON: 20 Q. Have you developed sufficient context to 21 understand whether these rules were Google -- 22 were appropriate for Google -- well, let me put 23 it this way -- I'll start over. 24 Have you developed sufficient context by 25 looking at the entire industry to understand</p>	<p style="text-align: right;">Page 245</p> <p>1 moved towards the first-price auction format, I 2 don't know all the details of the floors that 3 they enforce. 4 BY MR. ISAACSON: 5 Q. All right. The -- do you agree with 6 the statement in the Microsoft Xandr document 7 that establishing consistent price floors 8 minimizes bidder errors? 9 MR. WOLIN: Objection to form. 10 THE WITNESS: Thank you. 11 I think this is referring to what you 12 were talking about earlier, the potential of 13 bidding and -- via different intermediaries. 14 BY MR. ISAACSON: 15 Q. And do you agree with that statement, 16 that establishing consistent price floors 17 minimizes bidder error -- errors. 18 MR. WOLIN: Objection to form. 19 THE WITNESS: Broadly speaking, as you 20 characterized it earlier, that would be true. 21 BY MR. ISAACSON: 22 Q. And do you agree, broadly speaking, that 23 establishing consistent price floors improves 24 bidder decisioning by eliminating ambiguity? 25 MR. WOLIN: Objection to form.</p>

<p style="text-align: right;">Page 246</p> <p>1 THE WITNESS: That is of the same</p> <p>2 nature.</p> <p>3 MR. WOLIN: Should we take a break for a</p> <p>4 few minutes when you get to a good spot?</p> <p>5 MR. ISAACSON: Yeah.</p> <p>6 THE VIDEOGRAPHER: Going off the record</p> <p>7 at 4:14.</p> <p>8 (Recess taken.)</p> <p>9 THE VIDEOGRAPHER: Back on the record at</p> <p>10 4:27.</p> <p>11 BY MR. ISAACSON:</p> <p>12 Q. All right. If you'll look at your</p> <p>13 report, Paragraph 216 of your opening report.</p> <p>14 You say, "Google documents and experiment results</p> <p>15 suggest that UPR successfully helped shift</p> <p>16 business to AdX from rival exchanges for which</p> <p>17 publishers had previously set lower price</p> <p>18 floors," and then you cite two documents, I</p> <p>19 believe.</p> <p>20 This would be -- both are from August</p> <p>21 2019. This would be Footnote 498 and 499, right?</p> <p>22 A. Yes, I see that.</p> <p>23 Q. All right. So if we look at August 15,</p> <p>24 2019 -- this will be Exhibit --</p> <p>25 THE REPORTER: 11.</p>	<p style="text-align: right;">Page 248</p> <p>1 A. -- characterizes, yes.</p> <p>2 Q. Yes. Okay. And so their win rate</p> <p>3 dropped about 6 percent.</p> <p>4 A. That's about right.</p> <p>5 Q. So in this one document, this is one</p> <p>6 exchange saying their win rate dropped by 6</p> <p>7 percent in August 2019, correct?</p> <p>8 A. That's what the document says, yes.</p> <p>9 Q. Okay. And did you do anything to</p> <p>10 evaluate the methodology behind Rubicon's</p> <p>11 figures?</p> <p>12 MR. WOLIN: Objection to form.</p> <p>13 THE WITNESS: I did not do any</p> <p>14 independent analysis of their characterization.</p> <p>15 BY MR. ISAACSON:</p> <p>16 Q. Okay. You did not -- you don't -- you</p> <p>17 don't know how Rubicon got these figures, right?</p> <p>18 A. It seems to come from an internal chart</p> <p>19 in Rubicon.</p> <p>20 Q. Right. But you haven't -- you haven't</p> <p>21 seen any of the data or you don't know how they</p> <p>22 went about creating this.</p> <p>23 MR. WOLIN: Objection to form.</p> <p>24 THE WITNESS: Yeah. I'm not privy to</p> <p>25 how this chart was created.</p>
<p style="text-align: right;">Page 247</p> <p>1 MR. WOLIN: 11.</p> <p>2 MR. ISAACSON: 11?</p> <p>3 THE REPORTER: Yes.</p> <p>4 THE WITNESS: Thank you.</p> <p>5 (Ravi Exhibit No. 11, a document</p> <p>6 Bates Numbered GOOG-DOJ-15044036 through</p> <p>7 GOOG-DOJ-15044043, was introduced.)</p> <p>8 BY MR. ISAACSON:</p> <p>9 Q. All right. So Ravi Exhibit 11 is Bates</p> <p>10 stamped GOOGLE-DOJ-15044036 through 4043. It's</p> <p>11 dated August 26th, 2019. The footnote says</p> <p>12 August 15th, but it does have the same Bates</p> <p>13 stamp numbers you'll see. And for all I know</p> <p>14 that got picked up in an errata. But the -- and</p> <p>15 this is a memo from the Rubicon project that is</p> <p>16 on Page 039.</p> <p>17 Okay. And -- all right. So -- and the</p> <p>18 gentleman from Rubicon reports, "We went from a</p> <p>19 consistent 29 to 30 percent render rate to one</p> <p>20 now closer to 23 to 24 percent."</p> <p>21 And the render rate is their win rate.</p> <p>22 Is that how you understand it?</p> <p>23 A. That's what the first line in the next</p> <p>24 page --</p> <p>25 Q. Yes.</p>	<p style="text-align: right;">Page 249</p> <p>1 BY MR. ISAACSON:</p> <p>2 Q. And you did not evaluate the extent to</p> <p>3 which any effects reported here continued after</p> <p>4 August 2019, correct?</p> <p>5 MR. WOLIN: Objection to form.</p> <p>6 THE WITNESS: I have not investigated</p> <p>7 that.</p> <p>8 BY MR. ISAACSON:</p> <p>9 Q. And this document does not address</p> <p>10 impact on any exchange other than Rubicon,</p> <p>11 correct?</p> <p>12 A. This document backed up the example I</p> <p>13 provided in 216.</p> <p>14 Q. And it was just one example, right?</p> <p>15 MR. WOLIN: Objection to form.</p> <p>16 THE WITNESS: It was an example in 216.</p> <p>17 Yes, one example.</p> <p>18 BY MR. ISAACSON:</p> <p>19 Q. And did you evaluate to what extent</p> <p>20 Rubicon's figures were impacted by the unified</p> <p>21 first-price auction as opposed to the unified</p> <p>22 pricing rules?</p> <p>23 MR. WOLIN: Objection to form.</p> <p>24 THE WITNESS: Just to be clear, you're</p> <p>25 asking the effect of the spend of the Rubicon</p>

<p style="text-align: right;">Page 306</p> <p>1 before, I do not analyze any single competitor</p> <p>2 for their effects on experimentation.</p> <p>3 MR. ISAACSON: All right. I think I've</p> <p>4 got five minutes left. I cede it.</p> <p>5 MR. WOLIN: If we can go off the record</p> <p>6 and just take five minutes so I can speak with my</p> <p>7 colleagues, and then we'll come back and see if</p> <p>8 we have any follow-up questions.</p> <p>9 THE VIDEOGRAPHER: All right. We are</p> <p>10 off the record at 6:12 p.m.</p> <p>11 (Recess taken.)</p> <p>12 THE VIDEOGRAPHER: Back on the record at</p> <p>13 6:16.</p> <p>14 EXAMINATION</p> <p>15 BY MR. WOLIN:</p> <p>16 Q. Okay. Professor Ravi, I just have one</p> <p>17 or two questions for you.</p> <p>18 Could you pull out your rebuttal report,</p> <p>19 please, and turn to Paragraph 120 on Page 68?</p> <p>20 A. Yes, I see it. Yeah.</p> <p>21 Q. And the final sentence in Paragraph 120</p> <p>22 reads, "The principal places where I cite source</p> <p>23 code are where there's ambiguity or where the</p> <p>24 code contradicts the documents." Did I read that</p> <p>25 correctly?</p>	<p style="text-align: right;">Page 308</p> <p>1 page are ones that you applied in analyzing the</p> <p>2 conducts that you analyzed in reaching your</p> <p>3 opinions; is that correct?</p> <p>4 A. Yes. I first considered the programs</p> <p>5 that were relevant to the conducts I analyzed.</p> <p>6 And then, from that, I used that to narrow down</p> <p>7 the portion of the snapshots of code where I</p> <p>8 would analyze the -- the logic behind the code</p> <p>9 itself. And then I would use the code that I</p> <p>10 saw, and any additional questions it raised, to</p> <p>11 surface further documents. And I would repeat</p> <p>12 the cycle daily in my source code analysis. Yep.</p> <p>13 MR. WOLIN: Thank you, Professor Ravi.</p> <p>14 We have no further questions.</p> <p>15 MR. ISAACSON: No questions.</p> <p>16 MR. WOLIN: All right. Thank you. The</p> <p>17 deposition has ended.</p> <p>18 THE VIDEOGRAPHER: All right. If that</p> <p>19 is everything, off the record on February 20th,</p> <p>20 2024, at 6:19 p.m.</p> <p>21 (Deposition concluded -- 6:19 p.m.)</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 307</p> <p>1 A. That's what I wrote in the last</p> <p>2 sentence.</p> <p>3 Q. And is that a true and accurate</p> <p>4 statement of the work that you did in this case?</p> <p>5 A. Yes. The principal places. There might</p> <p>6 be one or other citations that -- to corroborate</p> <p>7 other things. But the principal places where I</p> <p>8 cite them are to clarify ambiguity or</p> <p>9 contradictions.</p> <p>10 Q. And if you look at the bottom of that</p> <p>11 page, carrying onto the next page, do you see</p> <p>12 Paragraph 123?</p> <p>13 A. Yes, I see it.</p> <p>14 Q. And specifically Subparagraph B that</p> <p>15 starts, "Second, I personally conducted and</p> <p>16 oversaw others." Do you see that?</p> <p>17 A. Yes. I remember that description.</p> <p>18 Q. And Subparagraph B explains the</p> <p>19 methodology you applied in reviewing source code;</p> <p>20 is that correct?</p> <p>21 A. Yes. This paragraph was in the context</p> <p>22 of my response to Professor Rinard's claims, and</p> <p>23 it lays out the steps that I carried out in -- in</p> <p>24 performing my own source code analysis.</p> <p>25 Q. And the steps that are written on this</p>	<p style="text-align: right;">Page 309</p> <p>1 C E R T I F I C A T E</p> <p>2</p> <p>3 I do hereby certify that I am a Notary</p> <p>4 Public in good standing, that the aforesaid</p> <p>5 testimony was taken before me, pursuant to</p> <p>6 notice, at the time and place indicated; that</p> <p>7 said deponent was by me duly sworn to tell the</p> <p>8 truth, the whole truth, and nothing but the</p> <p>9 truth; that the testimony of said deponent was</p> <p>10 correctly recorded in machine shorthand by me and</p> <p>11 thereafter transcribed under my supervision with</p> <p>12 computer-aided transcription; that the deposition</p> <p>13 is a true and correct record of the testimony</p> <p>14 given by the witness; and that I am neither of</p> <p>15 counsel nor kin to any party in said action, nor</p> <p>16 interested in the outcome thereof.</p> <p>17</p> <p>18 WITNESS my hand and official seal this</p> <p>19 22nd day of</p> <p>20 </p> <p>21</p> <p>22 Notary Public</p> <p>23</p> <p>24</p> <p>25</p>

<p style="text-align: right;">Page 310</p> <p>1 MICHAEL WOLIN, ESQ. 2 michael.wolin@usdoj.gov 3 February 22, 2024 4 RE: United States, Et Al v. Google, LLC 5 2/20/2024, Ramamoorthi Ravi (#6456599) 6 The above-referenced transcript is available for 7 review. 8 Within the applicable timeframe, the witness should 9 read the testimony to verify its accuracy. If there are 10 any changes, the witness should note those with the 11 reason, on the attached Errata Sheet. 12 The witness should sign the Acknowledgment of 13 Deponent and Errata and return to the deposing attorney. 14 Copies should be sent to all counsel, and to Veritext at 15 erratas-cs@veritext.com. 16 Return completed errata within 30 days from 17 receipt of testimony. 18 If the witness fails to do so within the time 19 allotted, the transcript may be used as if signed. 20 21 22 Yours, 23 Veritext Legal Solutions 24 25</p>	<p style="text-align: right;">Page 312</p> <p>1 United States, Et Al v. Google, LLC 2 Ramamoorthi Ravi (#6456599) 3 ACKNOWLEDGEMENT OF DEPONENT 4 I, Ramamoorthi Ravi, do hereby declare that I 5 have read the foregoing transcript, I have made any 6 corrections, additions, or changes I deemed necessary as 7 noted above to be appended hereto, and that the same is 8 a true, correct and complete transcript of the testimony 9 given by me. 10 11 _____ 12 Ramamoorthi Ravi Date 13 *If notary is required 14 SUBSCRIBED AND SWORN TO BEFORE ME THIS 15 _____ DAY OF _____, 20____. 16 17 18 _____ 19 NOTARY PUBLIC 20 21 22 23 24 25</p>
<p style="text-align: right;">Page 311</p> <p>1 United States, Et Al v. Google, LLC 2 Ramamoorthi Ravi (#6456599) 3 E R R A T A S H E E T 4 PAGE____ LINE____ CHANGE_____ 5 _____ 6 REASON_____ 7 PAGE____ LINE____ CHANGE_____ 8 _____ 9 REASON_____ 10 PAGE____ LINE____ CHANGE_____ 11 _____ 12 REASON_____ 13 PAGE____ LINE____ CHANGE_____ 14 _____ 15 REASON_____ 16 PAGE____ LINE____ CHANGE_____ 17 _____ 18 REASON_____ 19 PAGE____ LINE____ CHANGE_____ 20 _____ 21 REASON_____ 22 _____ 23 _____ 24 Ramamoorthi Ravi Date 25</p>	

HIGHLY CONFIDENTIAL – SUBJECT TO PROTECTIVE ORDER

ERRATA SHEET FOR THE TRANSCRIPT OF:

Deponent: Ramamoorthi Ravi

Case Name: *United States et al. v. Google LLC*

Deposition Date: February 20, 2024

CORRECTIONS:

Page	Line	Change or Correction	Reason
49	3	“I assessed the quality of pricing tool” should read “I assessed the quality of a pricing tool”	<i>Transcription Error or Mistake</i>
51	23-24	“It’s at 151, if you need to – if you remember it?” should read “It’s at 151, if you need to – maybe you remember it.”	<i>Transcription Error or Mistake</i>
56	4	“a separate one in New York” should read “a separate event in New York”	<i>Transcription Error or Mistake</i>
57	12	“InMobi helps procure advertising in mobile labs” should read “InMobi helps procure advertising in mobile apps ”	<i>Transcription Error or Mistake</i>
58	1-2	“In some as – in locations in the ad stack” should read “In some as – in some locations in the ad stack”	<i>Transcription Error or Mistake</i>
62	14	“something I heard about early on” should read “something I’d heard about early on”	<i>Transcription Error or Mistake</i>
76	13	“conduct of (c)(2)” should read “ content of (c)(2)”	<i>Transcription Error or Mistake</i>
88	1-2	“Google’s Waterfall and Dynamics Allocation” should read “Google’s Waterfall and Dynamic Allocation”	<i>Transcription Error or Mistake</i>
93	21	“Project says that their vendor rate declined from” should read “Project says that their render rate declined from”	<i>Transcription Error or Mistake</i>
94	15	“The reduction in vendor rate” should read “The reduction in render rate”	<i>Transcription Error or Mistake</i>
99	1-2	“attract new customers or retain existing customers” should read “attract new customers and retain existing customers”	<i>Transcription Error or Mistake</i>
101	22	“reasonable, yeah. Trying” should read “reasonable . . . trying”	<i>Transcription Error or Mistake</i>
103	6	“two-sided platforms similarly posits that marquis” should read “two-sided platforms similarly posits that marquee ”	<i>Transcription Error or Mistake</i>

HIGHLY CONFIDENTIAL – SUBJECT TO PROTECTIVE ORDER

103	14-15	“indeed, Ad Exchange is a two-sided platform” should read “indeed, an ad exchange is a two-sided platform”	<i>Transcription Error or Mistake</i>
104	2	“ad service have publishers and the ad exchanges,” should read “ad servers have publishers and the ad exchanges,”	<i>Transcription Error or Mistake</i>
104	4	“SSBs” should read “ SSPs ”	<i>Transcription Error or Mistake</i>
105	15	“using any data experiments that I have” should read “using any data experiments that I had ”	<i>Transcription Error or Mistake</i>
123	12	“We talked about the header bidding” should read “We talked about header bidding”	<i>Transcription Error or Mistake</i>
134	6	“I like that DFP made AdX more attractive...” should read “I write that DFP made AdX more attractive...”	<i>Transcription Error or Mistake</i>
136	21-22	“I have no opinion about specific features and other specific features...” should read “I have no opinion about other specific features.”	<i>Clarification</i>
138	15-16	“And you said that” should read “And you’ve said that”	<i>Transcription Error or Mistake</i>
143	24-25	“That's generally correct, yeah .” should read “That's generally correct.”	<i>Transcription Error or Mistake</i>
150	13-14	“Google had its own implementation of header bidding...” should read “Google had its own alternative to header bidding...”	<i>Clarification</i>
158	2-3	“Well, just as the disadvantages of the waterfall” should read “I discuss the disadvantages of the waterfall”	<i>Transcription Error or Mistake</i>
161	8-9	“And you have concluded that the launch project of Project Bell” should read “And you have concluded that the launch version of Project Bell”	<i>Transcription Error or Mistake</i>
176	15	“Okay. And Crivio would be another one” should read “Okay. And Criteo would be another one”	<i>Transcription Error or Mistake</i>
177	15-16	“MR. WOLIN: It's written for MBA students with short attention spans.” is an answer and should not be attributed to Mr. Wolin	<i>Transcription Error or Mistake</i>
198	21	“dynamic revenue sharing to applying to Google” should read “dynamic revenue sharing to apply to Google”	<i>Transcription Error or Mistake</i>
207	22	“DV360 perform this bid shading” should read “DV360 performed this bid shading”	<i>Transcription Error or Mistake</i>
210	22-23	“increases their conversions” should read “ increasing their conversions”	<i>Transcription Error or Mistake</i>

HIGHLY CONFIDENTIAL – SUBJECT TO PROTECTIVE ORDER

213	7	“Initial purchase with Poirot were overly-simple” should read “initial approaches with Poirot were overly-simple”	<i>Transcription Error or Mistake</i>
217	9	“Marple is a version” should read “Marple is the version”	<i>Transcription Error or Mistake</i>
217	16-17	“Have you expressed any criticism in your property of Marple?” should read “Have you expressed any criticisms in your report of Project Marple? ”	<i>Transcription Error or Mistake</i>
222	19-20	“I point out in my Rebuttal Report 2 that one could build a model” should read “I point out in my Rebuttal Report too that one could build a model”	<i>Transcription Error or Mistake</i>
232	19	“DVM bidding” should read “ DBM bidding”	<i>Transcription Error or Mistake</i>
237	15	“...a natural strategy to share” should read “...a natural strategy to shade ”	<i>Transcription Error or Mistake</i>
268	14-15	“And I think you say it a Gain at 82.” should read “And I think you say it again at 82.”	<i>Transcription Error or Mistake</i>
270	6	“experiment results suggests that EPR successfully” should read “experiment results suggests that UPR successfully”	<i>Transcription Error or Mistake</i>
282	2-3	“page in the summary we're talking about prior to Bernanke?” should read “page in the summary we're talking about Project Bernanke?”	<i>Transcription Error or Mistake</i>
294	9-11	“I examined the results of extensive computer models in arriving at the opinion” should read “I examined the results of extensive computer models in arriving at the opinions ”	<i>Transcription Error or Mistake</i>
296	5	“I remember a hundred thousand exchanges” should read “I remember a hundred thousand impressions ”	<i>Transcription Error or Mistake</i>

Date: 03/22/2024 Signature: 